

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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*DVD*

PCT *m*

WRITTEN OPINION

(PCT Rule 66)

*9 Dec 05 (n)*

Date of mailing  
(day/month/year)

09.12.2004

Applicant's or agent's file reference  
WO 21.1106

**REPLY DUE**

**within 2 month(s)**  
from the above date of mailing

International application No.  
PCT/EP 03/12069

International filing date (day/month/year)  
30.10.2003

Priority date (day/month/year)  
31.12.2002

International Patent Classification (IPC) or both national classification and IPC  
F16D57/02

Applicant  
SERVICES PETROLIERS SCHLUMBERGER ET AL

1. This written opinion is the **second** drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.
 

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6.

**If no reply is filed,** the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 30.04.2005

Name and mailing address of the international preliminary examining authority:



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**I. Basis of the opinion**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*):

**Description, Pages**

1-11 as originally filed

**Claims, Numbers**

1-23 as originally filed

**Drawings, Sheets**

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

6. Additional observations, if necessary:

**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	1
Inventive step (IS)	Claims	1
Industrial applicability (IA)	Claims	

**2. Citations and explanations****see separate sheet**

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: PATENT ABSTRACTS OF JAPAN vol. 2002, no. 06, 4 June 2002 (2002-06-04) -& JP 2002 048164 A (TCM CORP), 15 February 2002 (2002-02-15)  
D2: US-A-3 599 906 (REINEMUTH GEORGE HORST) 17 August 1971 (1971-08-17)  
D3: US-A-5 924 534 (OKUBO MASAHIRO) 20 July 1999 (1999-07-20)  
D4: FR-A-1 009 991 (PICAND ROLAND-ANDRE; TENOT ANDRE-LOUIS) 5 June 1952 (1952-06-05)  
D5: US-A-3 728 040 (IOANNESIAN R ET AL) 17 April 1973 (1973-04-17)

2. The present application does not satisfy the criterion set forth in Article 33(2) PCT because the subject-matter of claim 1 is not new in respect of the prior art as defined in the regulations (Rule 64(1)-(3) PCT).

2.1 With respect to independent claim 1:

Document D1 discloses (the reference signs in parenthesis applying to this document):

A hydraulic braking device *suitable* for a turbine (1), the said turbine (1) being provided with a turbine shaft(6,7), **wherein**

it comprises at least one body (21) connected to the said turbine shaft (6, 7), and that when the said hydraulic braking device is immersed in a fluid medium, rotation of the turbine shaft (6,7) about its axis causes a movement of the said at least one body (21) with respect to the said fluid medium, this movement generating a resisting torque related to the rotation speed of the turbine shaft (6,7) through a *non-linear relation*\* (see especially figs. 1, 2 and abstract).

\* It is implicitly known from D1 (or commonly known in the field, see e.g. D2, column 2, lines 71-73) that the resisting torque, in a hydraulic braking device of the specified type, has a non-linear relation with regard to the rotation speed.

Thus all the features of claim 1 are known from D1.

2.1.1 The subject matter of claim 1 is also not novel over D5.

3. Dependent claims 2-23:

The dependent claims 2-23 do not appear to contain any additional features which, in combination with features of any claim to which they refer, meet the requirements of the PCT with respect to novelty and/or inventive step (Articles 33(2) und 33(3) PCT), as all the features introduced with these claims seem to be either known from each of D1 or D5, or known from a combination with D2-D4, or known while used with a known corresponding effect and/or seem to introduce slight constructional changes without inventive meaning and which come within the scope of the customary practice followed by persons skilled in the art.

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**Schlumberger**

10/540236  
JC17 Rec'd PCT/PTO 21 JUN 2005

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Confirmation by Mail*

International Preliminary Examining Authority  
European Patent Office  
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Clamart, 09 February 2005

International Patent Application no. **PCT/EP03/12069**  
Applicants: **Services Pétroliers Schlumberger et al.**  
Our Ref: **WO 21.1106**

Dear Sirs,

I refer to the Written Opinion dated December 9, 2004 and enclose herewith triplicate copies of an amended set of claims to replace the claims presently on file.

With regard to the specific comments in item V of the written opinion, the applicants comment as follows:

The new set of claims is believed to overcome the objection of novelty raised against claim 1 as filed. Document D1, discloses a hydraulic braking device applied to a vehicle, wherein a turbine shaft rotates with fans when immersed into a fluid medium. D1 does not disclose the quadratic relation between the resisting torque and the rotation speed of the turbine shaft in said fluid medium.

Document D5 discloses a hydraulic braking device for the turbine shaft of a drilling apparatus. However, D5, as for D1, does not disclose the quadratic relation between the resisting torque and the rotation speed of the turbine shaft in said fluid medium.

Document D2 discloses a hydraulic braking device for an airplane. This document discloses the fact that the resisting torque of a hydraulic brake is a quadratic function of the rotation speed of the turbine shaft.

The new set of claims intends to cover a hydraulic braking device for a drilling device. The man skilled in the art is thus the one specialized in drilling. Document D5 should thus be considered as the closest prior art. However, there is no doubt that such a skilled man would have never attained any of the documents D1 or D2 that are far away from his area of competency. It is therefore clear that the man skilled in the art of drilling devices would had never combine document D5 and documents D2.

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Furthermore, more than the fact that the man skilled in the art would not have had access to documents D1 and D2, combination of these documents would not have led to the braking device as claimed in new claim 1.

The applicants believe that this response addresses the issues raised by the examiner and request that a favorable international preliminary examination report be issued forthwith.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Raybaud', with a stylized flourish at the end.

Hélène RAYBAUD  
European Patent Attorney

Encl.

CLAIMS

10/540236

JC17 Rec'd PCT/P10 21 JUN 2005

1. Hydraulic braking device (10) for a turbine (2) in a drilling equipment, the said turbine (2) being provided with a turbine shaft (4),  
characterized in that it comprises at least one body (12) connected to the said turbine shaft (4),  
and in that when the said hydraulic braking device (10) is immersed in a fluid medium, rotation of the turbine shaft (4) about its axis (6) causes a movement of the said at least one body (12) with respect to the said fluid medium, this movement generating a resisting torque (T) that is a function of the square of the rotation speed ( $\omega_t$ ) of the turbine shaft (4) with respect to the said fluid medium.
2. Device (10) according to claim 1, characterized in that it comprises a braking shaft (14) coupled to the said turbine shaft (4), and in that the said at least one body (12) is connected to the said braking shaft (14).
3. Device (10) according to claim 2, characterized in that the said coupling between the braking shaft (14) and the turbine shaft (4) is such that an axial rotation of the turbine shaft (4) causes axial rotation of the braking shaft (14).
4. Device (10) according to either of claims 2 or 3, characterized in that the braking shaft (14) is coaxial with the turbine shaft (4).
5. Device (10) according to any one of claims 2 to 4, characterized in that the braking shaft (14) and the turbine shaft (4) are combined into a single shaft.
6. Device according to any one of claims 2 to 4, characterized in that the braking shaft (14) and the turbine shaft (4) are coupled through a coupling device (50).
7. Device (10) according to claim 6, characterized in that the said coupling device (50) is a gearbox.



8. Device (10) according to claim 6 or 7, characterized in that the said coupling device (50) is a clutch.

9. Device (10) according to one of claims 2 to 8, characterized in that the said at least one body (12) is driven in rotation with the braking shaft (14) when the turbine shaft (4) rotates about its axis.

10. Device (10) according to any one of claims 2 to 9, characterized in that the said at least one body (12) is rigidly connected to the said braking shaft (14) through a connecting means (18, 20).

11. Device (10) according to any one of claims 2 to 10, characterized in that the said at least one body (12) is fixed directly onto the braking shaft (14) through a connecting means composed of at least one anchor zone (18) of the body (12).

12. Device (10) according to any one of claims 2 to 10, characterized in that the said at least one body is connected to the said braking shaft (14) through a connecting means composed of at least one rigid arm (20).

13. Device (10) according to claim 11 or 12, characterized in that the said connecting means (18, 20) has a streamlined profile.

14. Device (10) according to any one of claims 2 to 13, characterized in that when it comprises more than one body (12), the said bodies (12) are distributed around the periphery of the braking shaft (14), in a regular manner, or in a non-regular manner.

15. Device (10) according to any one of claims 2 to 14, characterized in that when it comprises more than one body (12), the said bodies (12) have either all the same axial positions along the braking shaft (14), or different axial positions along the braking shaft (14).

16. Device (10) according to claim 1 to 15, characterized in that when it comprises more than one body (12), the said bodies (12) are chosen to be identical or different

17. Device (10) according to any one of claims 1 to 16, characterized in that when it comprises more than one body (12), the said bodies (12) all have the same dimensions.

18. Device (10) according to claim 6 or 7, characterized in that the bodies may be profiled bodies or non-profiled bodies.

19. Device (10) according to claim 1 to 18, characterized in that it is arranged on the downstream side of the turbine (2) with respect to a flow direction of the fluid medium.

20. Turbine (2), characterized in that it is equipped with a hydraulic braking device (10) according to any one of claims 1 to 19.

21. Turbine (2) according to claim 20, characterized in that the turbine (2) is immersed in a first fluid medium and the braking device (10) is immersed in a second fluid medium.

22. Drilling equipment, characterized in that it comprises at least one turbine (2) equipped with a hydraulic braking device (10), according to claim 20 or 21.